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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/295,329	04/21/99	KAWABE	Y 054114

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IM22/0519

EXAMINER

CLARKE, Y

ART UNIT	PAPER NUMBER
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1752

DATE MAILED:

05/19/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/295,329

Applicant(s)

KAWABE ET AL.

Examiner

Yvette M Clarke

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

- 1) ☒ Responsive to communication(s) filed on 07 February 2000.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☒ All b) ☐ Some * c) ☐ None of the CERTIFIED copies of the priority documents have been:
1. ☒ received.
2. ☐ received in Application No. (Series Code / Serial Number) _____.
3. ☐ received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

- 14) ☐ Notice of References Cited (PTO-892)
- 15) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 16) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.
- 17) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 18) ☐ Notice of Informal Patent Application (PTO-152)
- 19) ☐ Other: _____.

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DETAILED ACTION

This is written in reference to application number 09/295329 filed on April 21, 1999.

Response to Amendment

1. The amendments to claims 2 and 9 are sufficient to overcome the rejection of the said claims under 35 USC 112-second paragraph set forth in the prior office action.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aoai (US 5,945,250) in view of Iwasa (US 5,691,111). Aoai teaches a positive photoresist composition comprising a sulfonium or iodonium salt resin capable of generating a sulfonic acid upon irradiation with actinic rays or a radiation. In one embodiment (2) the photoresist composition comprises the said resin and a resin having groups which decompose by action of an acid. Another embodiment (3) comprises a the composition of embodiment (2) and a low molecular acid decomposable dissolution inhibitive compound having a molecular weight of 3,000 or lower which has groups decomposable by an acid. A fourth embodiment comprises the composition of either (2) or (3) and a resin insoluble in water and soluble in an aqueous alkaline solution. Aoai also teaches an embodiment (5) having the resin (1), a low molecular acid-

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decomposable dissolution inhibitive compound having a molecular weight of 3,000 or less, and a water insoluble resin. (See column 5, line 20-51) The resin having sulfonium or iodonium salt has structural units represented by formulae (I) to (IV) is useful as a photoacid generator (column 5, lines 52-60). Specific example of the resin having acid decomposable group are presented in column 42, line 15-column 45, line 39, however the resin should not be construed as being limited thereto. A resin insoluble in water and soluble in an aqueous solution is referred to in the reference as an alkali soluble resin. Especially preferred alkali-soluble resins are novolak resin, poly(hydroxystyrenes) and copolymers of hydroxystyrenes and styrene, etc.(column 46, line 20-column 48, line 4). The acid-decomposable dissolution inhibitive compound is desirably either a compound, which has at least two acid-decomposable groups in the molecular structure. Examples of specific compounds are presented in (column 50, line 20-column 85, line 40). The photosensitive composition of the reference may further contain other ingredients such as dyes, pigments, plasticizers, surfactants, and organic basic compounds (column 85, lines 61-67). Desirable organic basic compounds usable in the reference are compounds, which are more strongly basic than phenol, in particular, nitrogen-containing basic compounds (column 87, line 17-column 88, line 42). Preferred organic basic compounds are nitrogen containing basic compounds having two or more nitrogen atoms per molecule having different chemical environments (column 87, lines 57-60). The photosensitive composition is used in the form of a solution in a solvent in which the ingredients of the said composition can

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dissolve. Preferred examples of solvents include propylene glycol monomethyl ether, ethyl lactate, methyl methoxypropionate, etc. The solvents may be used alone or as a mixture thereof (column 89, lines 13-26). A surfactant can be added to the solvent. Examples of the surfactant include nonionic surfactants fluorochemical surfactants, organosiloxane polymer and (meth)acrylic copolymers. The surfactant may be added alone or in combination of two or more thereof (column 89, lines 27-28). Table 2 exemplifies the use of a solvent mixture of ethyl lactate and ethyl 3-ethoxypropionate (7/3).

Aoai teaches all the limitations of the claims except the use of a polymer having an alicyclic hydrocarbon skeleton and decomposes by the action of an acid to thereby become alkali-soluble. Iwasa teaches a photosensitive resin composition useful as a resist for deep UV lithography containing sulfonium salts. The photosensitive composition according to the reference is useful in the range of 220 to 180 nm. The reference provides a novel alkylsulfonium salt which are represented by the general formula (1A) or (1B) and collectively represented by the formula (1C). The polymer for the photosensitive resin composition must be fairly high in transparency to deep UV rays. It is suitable to use a polymer which is represented by general formula 2 or 3 which contains a monocyclic or bridged cyclic hydrocarbon group (see column 6). The photosensitive composition is used as a solution in an organic solvent. Suitable solvents include methyl 3-methoxypropionate, ethyl lactate, and ethylene glycol monomethyl ether (column 7, lines 32-52). The said composition may also contain an

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auxiliary component selected from various additives such as surfactants, dyes, stabilizers and applicability improvers (column 7, lines 53-57). Iwasa discloses in his background that the existence of aromatic rings in the molecular structure of every acid generator produces strong absorptions at wavelengths shorter than 220 nm (column 2, lines 48-55). Iwasa also teaches that the presence of aromatic rings in the base component of the composition also causes strong absorptions in spectral regions shorter than 248 nm (column 2, lines 30-47). Therefore one of ordinary skill in the art would have been motivated to substitute the photoacid generator and the base polymer of Iwasa for the either or both of the suitable acid generators and the resin having groups decomposing by action of an acid as taught by Aoai. Motivation is based on the desire to develop a photosensitive resist composition that is useful in deep UV lithography.

Response to Arguments

4. Applicant's arguments filed February 7, 2000 have been fully considered but they are not persuasive. Applicants argue that the prior art reference of Aoai fails to teach and/or suggest the use of alicyclic polymers. The examiner agrees and incorporated the secondary reference of Iwasa (US 5691111) to meet that claim limitation. Aoai as discussed above, teaches all the limitations of the claims except the use of a polymer having an alicyclic hydrocarbon skeleton and decomposes by the action of an acid to thereby become alkali-soluble. Aoai does however teach the use of a resin insoluble in water and soluble in an aqueous solution, which are referred to in the reference as an

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alkali soluble resin. Especially preferred alkali-soluble resins are novolak resin, poly(hydroxystyrenes) and copolymers of hydroxystyrenes and styrene, etc.(column 46, line 20-column 48, line 4). Iwasa teaches that novolac resins and poly(p-vinylphenol) resins which have aromatic rings in the repeating units of the polymer cannot be used in resists for lithographic processes using radiation of shorter wavelength, particularly shorter than 220 nm (c. 2, l. 29-47). Iwasa teaches that suitable polymers having at least one functional group, which is susceptible to acidolysis are alicyclic type polymers represented by formulae 2 and 3 (c. 6, l. 1-54). One of ordinary skill in the art would have been motivated by the teachings of Iwasa to substitute the alicyclic polymers of Iwasa for the novolak type resins of Aoai in order to make a photosensitive resist composition that is useful in deep UV lithography preferably at 220 nm or below.

5. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

6. Applicants also argue that the teachings of Aoai fail to disclose any working examples where a surfactant is used, much less a fluorine-containing surfactant or a silicon-containing surfactant. Aoai clearly teaches that a surfactant can be added to the solvent of the photosensitive composition. Examples include fluorochemical surfactants such as F-TOP EF301, EF303 and EF352, FLUORAD FC430 and FC 4321; and

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organosiloxane polymer KP341 (c. 89, l. 27-58), which are also disclosed by the applicant as suitable surfactants for the claimed invention (spec., pg. 42). The use of the taught surfactants does not have to be exemplified as long as the specification of the given reference is enabling for one of ordinary skill to make and use a composition comprising the taught surfactant(s).

7. Applicants as assert that the comparative examples (6b, 7b, and 6c) presented in the specification used a polymer E which is closest to the PHS/BES polymer used in Examples 5 and 6 of Aoai show and prove the surprising results of the claimed invention. The examiner agrees that polymer E is the closest to the Aoai's examples 5 and 6 however, the examiner fails to see any showing of comparative results. All the examples of the claimed invention presented by the applicant comprise polymer A-D. There are no data of polymer E as a component of the claimed invention. A direct comparison of the claimed invention and the closest prior art would be necessary in order to make a showing of surprising results.

8. The combination of Aoai and Iwasa meets the limitations of the claims as written. Therefore, the rejection set forth previously and restated above is hereby *maintained*.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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a. Aoai et al., (EP 0878738) which teaches a positive resist composition useful at 220 nm or less and comprises a resin having a polycyclic type alicyclic group.

b. Suwa et al., (EP 0789278) which teaches a radiation sensitive resin composition comprising a resin containing an alicyclic skeleton and a radiation sensitive acid generating agent.

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

11. A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

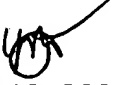
12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yvette M Clarke whose telephone number is 703-305-0589. The examiner can normally be reached on Monday-Thursday 7-5:30.

13. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Janet Baxter can be reached on 703-308-2303. The fax phone numbers for

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the organization where this application or proceeding is assigned are 703-305-3599 for regular communications and 703-305-3599 for After Final communications.

14. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

ymc 
May 10, 2000



JANET BAXTER
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700